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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/809,269

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Ian G. Brown

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11/30/2009

LAWRENCE BERKELEY NATIONAL LABORATORY

Technology Transfer & Intellectual Property Managem

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EXAMINER

BEISNER, WILLIAM H

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

11/30/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/809,269

Applicant(s)

BROWN ET AL.

Examiner

WILLIAM H. BEISNER

Art Unit

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 September 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 7-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Double Patenting

1. Applicant is advised that should claim 1 be found allowable, claim 35 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k). Claim 35 recites that the thin patterned film is diamond-like carbon, however, claim 1 already requires this claim limitation.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 2-5, 7, 8 and 14-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 14, “the neuron chip platform” lacks clear antecedent basis. Note the claim previously employs the language “a cellular chip platform”. Clarification and/or correction is requested.

Claims 2-5, 7, 8 and 14-21 are indefinite based merely on their dependency from claim 14.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1, 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kovacs et al.(US 5,981,268) in view of either Luo et al.(Bio-Medical Materials and Engineering) or Franks (US 4,968,623).

The reference of Kovacs et al. discloses a chip platform device that includes a CCD detector array (Fig.5:57), a thin protective film (Fig.5:58) over the CCD, and an insulating material (Fig.5:55) for insulating CCD electronics from a cell culture.

Claim 1 differs by reciting that the chip platform also includes a thin patterned film applied to the protective film.

The references of Luo et al. (See the abstract) and Franks (See the abstract) disclose that it is known in the cell culture art to employ a thin film of diamond-like carbon material to improve cell adhesion to a culture surface.

In view of any of these teachings, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the detector array of the primary reference with a thin film of diamond-like carbon material to improve cell adhesion to the surface of the detector array.

With respect to claim 35, the references of Luo et al. and Franks disclose the use of diamond-like carbon.

With respect to claim 36, the use of culture adhesion proteins is notoriously well known in the art to facilitate and/or selectively culture cells on a culture surface. As a result, it would have been obvious to one of ordinary skill in the art to provide the device of the modified primary reference with culture adhesion proteins for the known and expected result of manipulating and/or facilitating the adhesion of the cultured cells to the detector surface.

8. Claims 2-5 and 7-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kovacs et al.(US 5,981,268) in view of either Luo et al.(Bio-Medical Materials and Engineering) or Franks (US 4,968,623) taken further in view of Miyamoto (US 5,702,915).

The combination of the reference of Kovacs et al. with either of Luo et al. or Franks has been discussed above.

Claims 14 and 22 differ by reciting that the chip platform is provided in combination with an electrical connection system and image and/or signal processing means connected to the connection system. Claim 14 further recites an illumination source.

While the reference of Kovacs et al. discloses the use of both microelectrodes and CCD in the detection array, the reference is silent with respect to the imaging electronics and/or processors, including an illumination source.

The reference of Miyamoto discloses that it is known in the cell culture art to interface a cell culture with a CCD array (1) wherein the detection system includes control and/or processing electronics (8-10). The device also includes an illumination source (6).

In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the imaging electronics disclosed by the reference of Miyamoto in combination with the CCD sensors disclosed by the reference of Kovacs et al. for the known and expected result of providing an art recognized means for interfacing the CCD of the primary reference with an image processing and control system.

With respect to the pixel size recited in claims 2 and 33, if not inherently met, it would have been obvious to one of ordinary skill in the art to optimize the size of the pixels based merely on the size of the cells intended to be used in the detector system.

With respect to claim 3, if the claimed film structure is not inherently met, it would have been obvious to one of ordinary skill in the art to determine the optimum manner in which to provide the film layers.

With respect to claims 4, 24 and 25, the reference of Kovacs et al. discloses that film layer (58) can be silicon nitride (See column 12, lines 20-25).

With respect to claim 5, if the claimed film structure is not inherently met, it would have been obvious to one of ordinary skill in the art to determine the optimum thickness of the film while maintaining the required functions of the sensor system.

With respect to claim 34, the references of Luo et al. or Franks disclose that the film is made of diamond-like carbon.

With respect to claim 7, if the claimed film structure is not inherently met, it would have been obvious to one of ordinary skill in the art to determine the optimum thickness of the film while maintaining the required functions of the sensor system.

With respect to claims 8, 26 and 27, the reference of Kovacs et al. discloses a number of insulation materials that can be used (See column 13, lines 35-46).

With respect to claims 15 and 23, the detector chip is capable of being detachable from the other system components.

With respect to claims 13 and 16, the reference of Kovacs et al. discloses that the device also include microelectrode structures formed on the device (See Figure 5, elements 52 and 56). Whether the electrodes are formed by etching the film layer (58) or by forming the electrode layer on the surface of film (58) would have been well within the purview of one having ordinary skill in the art while maintaining the function of the detection device.

With respect to claims 9-11, 17 and 18, the use of culture adhesion proteins is notoriously well known in the art to facilitate and/or selectively culture cells on a culture surface. As a result, it would have been obvious to one of ordinary skill in the art to provide the device of the modified primary reference with culture adhesion proteins for the known and expected result of manipulating and/or facilitating the adhesion of the cultured cells to the detector surface.

With respect to claim 20, use of the device in the manner suggested by the prior art combination, would result in the method steps recited in claim 20.

With respect to claims 19, 21, 28 and 29, the device is capable of being used with cardiac cells. Note, the cells are considered material work on and do not further distinguish the structure of the claimed device.

With respect to claim 12, the reference of Kovacs et al. (See column 15, lines 53-63) discloses environmental control of the culture conditions.

With respect to claim 30, the reference of Miyamoto discloses the use of illumination source (6).

With respect to claims 31 and 32, the reference of Kovacs et al. discloses control electronics for applying voltage to the microelectrode array (See column 11, lines 48-60).

Response to Amendment

9. The declarations under 37 CFR 1.132 filed 9/3/2009 are insufficient to overcome the rejection of claims 1-5 and 7-36 based upon the combination of the references of Kovacs et al. in view of Luo et al. or Franks alone or further in view of Miyamoto as set forth in the last Office action because:

It refer(s) only to the system described in the above referenced application and not to the individual claims of the application. Thus, there is no showing that the objective evidence of nonobviousness is commensurate in scope with the claims. See MPEP § 716. Specifically, the patterning, thicknesses and/or electrostatic features discussed in the declarations are included in the instant claims.

Response to Arguments

10. With respect to the rejection of Claims 1, 35 and 36 under 35 U.S.C. 103(a) as being unpatentable over Kovacs et al.(US 5,981,268) in view of either Luo et al.(Bio-Medical Materials and Engineering) or Franks (US 4,968,623), Applicants argue that the rejection is not proper for the following reasons:

i) None of the references of Kovacs et al., Luo et al. or Franks, disclose “the thin diamond-like carbon film is patterned so as to pattern cellular growth” (See pages 8-11 of the response file 9/3/2009).

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the cell patterning disclosed in the instant specification) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Note the instant claims are not commensurate in scope with the arguments with respect to the patterning required of the instant invention when compared with the teachings of the prior art references of Lu et al. and Franks. Note the instant claims do not define over a coating that

covers the entire exposed surface of the culture surface. Applicants cannot rely on the disclosure of page 12 of the specification to define over such a coating unless the instant claim language further defines what is intended by the language "is patterned so as to pattern cellular growth". Clearly a coating provided over the entire culture surface can be considered a patterned so as to pattern cellular growth. The instant claims are completely silent with respect to control of connections between neurons as argued by Applicants on page 10 of the response filed 9/3/2009.

ii) The reference of Kovacs et al. is deficient because it does not disclose patterned cell growth directly on the surface of the CCD. Applicants stress that the reference of Kovacs et al. is drawn to photodetection rather than electrostatic detection associated with the instant invention (See pages 11-12 of the response filed 9/3/2009).

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this case, the references of Luo et al. and Franks are relied upon to disclose the use of a thin layer of diamond-like carbon. Again it is stressed that the instant claim language does not define over a coating of the entire culture surface.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., electrostatic verses photodetection) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). It is stressed that the instant

claims are silent with respect to the electrostatic detection argued by applicants. Again applicants appear to be reading limitations from the specification into the claims.

11. With respect to the rejection of Claims 2-5 and 7-34 under 35 U.S.C. 103(a) as being unpatentable over Kovacs et al.(US 5,981,268) in view of either Lu et al.(Bio-Medical Materials and Engineering) or Franks (US 4,968,623) taken further in view of Miyamoto (US 5,702,915), Applicants argue that the rejection is not proper for the following reasons:

i) None of the references of Kovacs et al., Luo et al., Franks or Miyamoto, disclose "the thin diamond-like carbon film is patterned so as to pattern cellular growth" (See pages 12-13 of the response file 9/3/2009).

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the cell patterning disclosed in the instant specification) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Note the instant claims are not commensurate in scope with the arguments with respect to the patterning required of the instant invention when compared with the teachings of the prior art references of Lu et al. and Franks. Note the instant claims do not define over a coating that covers the entire exposed surface of the culture surface. Applicants cannot rely on the disclosure of page 12 of the specification to define over such a coating unless the instant claim language further defines what is intended by the language "is patterned so as to pattern cellular growth". Clearly a coating provided over the entire culture surface can be considered a patterned so as to

pattern cellular growth. The instant claims are completely silent with respect to control of connections between neurons as argued by Applicants on page 10 of the response filed 9/3/2009. It is further noted that claim 22 merely claims "a thin patterned film".

ii) Like the reference of Kovacs et al., the reference of Miyamoto is deficient because it does not disclose patterned cell growth directly on the surface of the CCD. Applicants stress that the reference of Miyamoto drawn to photodetection rather than electrostatic detection associated with the instant invention (See pages 11-12 of the response filed 9/3/2009).

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this case, the references of Luo et al. and Franks are relied upon to disclose the use of a thin layer of diamond-like carbon. Again it is stressed that the instant claim language does not define over a coating of the entire culture surface.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., electrostatic verses photodetection) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). It is stressed that the instant claims are silent with respect to the electrostatic detection argued by applicants. Again applicants appear to be reading limitations from the specification into the claims. It is further

noted that the instant claims appear to employ photodetection as well since the claims include reference to image processing structures.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to WILLIAM H. BEISNER whose telephone number is (571)272-1269. The examiner can normally be reached on Tues. to Fri. and alt. Mon. from 6:15am to 3:45pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael A. Marcheschi, can be reached on 571-272-1374. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

**/William H. Beisner/
Primary Examiner
Art Unit 1797**

WHB